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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/564,344

05/30/2006

Francois Conti

010-05-022

9059

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7590

02/25/2009

EXAMINER

PILKINGTON, JAMES

ART UNIT

PAPER NUMBER

3656

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/564,344	<b>Applicant(s)</b> CONTI, FRANCOIS	
	<b>Examiner</b> JAMES PILKINGTON	<b>Art Unit</b> 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The references cited in the Search Report EPO 9/1/04 have been considered, but will not be listed on any patent resulting from this application because they were not provided on a separate list in compliance with 37 CFR 1.98(a)(1). In order to have the references printed on such resulting patent, a separate listing, preferably on a PTO/SB/08A and 08B form, must be filed within the set period for reply to this Office action.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the processor and sensors must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

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of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not provide support for a processor which calculates the position of the moveable member based on the results of measuring the aperture angel of each control arm. Where is this processor? How is it connected to the sensors?

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "at least one moveable member...each providing three translational degrees of freedom" in lines 2-3. The phrase "at least one" requires only one but not more and the term "each" seems to be implying that more than one is being

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claimed. If by the limitation "at least one" the Applicant is attempting to have more than one be required by the claim the Examiner suggests rephrasing "at least one" to be - - at least two- -.

The term "close" in claim 3 is a relative term which renders the claim indefinite. The term "close" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. What is considered to be "close"?

Claim 6 recites the limitation "the articulations" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation "linking bar" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 20 recites the limitation "the wrist module" in line 2. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 15, 19, 21 and 22, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Rosheim, USP 6,038,940.

Rosheim discloses a device for transmitting a movement, comprising:

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- at least one moveable member (33) which is coupled to at least one parallel kinematics transmission structure (arms 20 and 30) each providing at least three translational degrees of freedom (activation the arms separately allows for three degrees of freedom of 33 x, y, z and slight pivoting or tipping)
- at least one rotative actuator (motor connected to motor shafts 15' and 16' there is one for each arm, see C7/L1-25) which is coupled to the parallel transmission structure (see Figure 2) over a control arm (20-20'') such that translational movement of the moveable member (33) is converted into rotational movement of a portion of the rotative actuator, or vice versa;
- wherein the rotative actuator (motors) is arranged such that its axis is substantially perpendicular to a rotation axis (along the axis of bevel gears 15'' and 16'') of the control arm (20-20'')
- wherein the moveable member (33) is coupled to three parallel kinematics transmission structures (total of 4 arm arrangements shown) in a delta type arrangement, wherein each parallel kinematics transmission structure is being coupled to a respective rotative actuator (each arm has its own motor, see C7-C8), wherein the rotative actuators (motors) are arranged such the their axes are substantially parallel to each other (the axes of each motor is the shaft that holds the bevel gears 15' and 16')
- wherein the rotative actuators (motors) are arranged on a common base member (inside 11) of the device in a close relationship to each other

- the device is a haptic device for providing a user with force-feedback information (monitor arrangement 34-34''')
- the device comprising keys, control wheels, force grippers or other elements used for a human computer interface (34-34''')
- The device is a manipulator/measuring system for providing movements of at least three translational degrees of freedom to a manipulation member (33)

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4, 5 and 9-12, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosheim '940 in view of Salisbury, Jr., USP 5,046,375.

Rosheim discloses all of the claimed subject matter as applied above.

Rosheim does not disclose a cable member to transmit movements between the rotative actuator and the control arm, wherein the cable member is coupled to a shaft of the rotative actuator at one end and to the respective control arm at the other, wherein the shaft of the rotative actuator is adapted to enable secure coiling and uncoiling of the cable member, wherein the cable member is coupled at a fixation point of the control arm such as to allow the end of the cable to rotate with respect to the control arm, at least one redirection member for each control arm, wherein each

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redirection member is fixedly mounted on a base member of the device and located between the control arm and the shaft of the respective rotative actuator, wherein the redirection member is located a distance from the shaft of the respective rotative actuator such as to allow an appropriate incidence of the cable member on the shaft of the actuator.

Salisbury, Jr. discloses a cable member (19a) used to transmit movements between a rotative actuator (14) and a control arm (18), wherein the cable member (19a) is coupled to a shaft (32a) of the rotative actuator (14) at one end and to the respective control arm at the other (coupled to the arm via additional cable assembly), wherein the shaft (32a) of the rotative actuator (14) is adapted to enable secure coiling and uncoiling of the cable member (19a, 32a is a spoil), wherein the cable member (19a) is coupled at a fixation point of the control arm such as to allow the end of the cable to rotate with respect to the control arm (the coupling of the cable 19c allows for rotation of 19a on 20a relative to arm 18), at least one redirection (20a) member for each control arm (18), wherein each redirection member (20a) is fixedly mounted on a base member (22) of the device and located between the control arm (18) and the shaft (32a) of the respective rotative actuator (14), wherein the redirection member is located a distance from the shaft of the respective rotative actuator such as to allow an appropriate incidence of the cable member on the shaft of the actuator (see Figure 2) for the purpose of providing a transmission system which is highly stiff, exhibits low frictional losses and has good fidelity of force transmission.



It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Rosheim and provide a cable member to transmit movements between the rotative actuator and the control arm, wherein the cable member is coupled to a shaft of the rotative actuator at one end and to the respective control arm at the other, wherein the shaft of the rotative actuator is adapted to enable secure coiling and uncoiling of the cable member, wherein the cable member is coupled at a fixation point of the control arm such as to allow the end of the cable to rotate with respect to the control arm, at least one redirection member for each control arm, wherein each redirection member is fixedly mounted on a base member of the device and located between the control arm and the shaft of the respective rotative actuator, wherein the redirection member is located a distance from the shaft of the respective rotative actuator such as to allow an appropriate incidence of the cable member on the shaft of the actuator, as taught by Salisbury, Jr., for the purpose of providing a transmission system which is highly stiff, exhibits low frictional losses and has good fidelity of force transmission.

10. Claims 6 and 7, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosheim '940 in view of Arai (document cited in PCT search report).

Rosheim discloses all of the claimed subject matter as applied to claim 1 above.

Rosheim does not disclose where at least some of the articulations [joints] of the parallel kinematics transmission structure are flexible hinge articulations and wherein at

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least two of the base member, control arm, linking bar and flexible hinge articulations are made from one piece.

Arai teaches an articulation that can be used in a parallel kinematics transmission structure which is a flexible hinge (see Figure 1a and section 2.1) wherein the flexible hinge articulations and a control arm (left or right of center portion of the hinge in figure 1a is a control arm) are made from one piece.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Rosheim and provide for at least some of the articulations [joints] of the parallel kinematics transmission structure are flexible hinge articulations and wherein at least two of the base member, control arm, linking bar and flexible hinge articulations are made from one piece, as taught by Arai, since substituting one hinge type for another would achieve the predictable result of allowing movement between the connected elements.

11. Claims 8, 13 and 14, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosheim '940 in view of Hendzel, USP 6,412,844.

Rosheim discloses all of the claimed subject matter as applied above.

Rosheim does not disclose that the control arm is provided with a restoring element such as to provide a restoring force against the force exerted by the rotative actuator comprising a torsional spring arranged to bias the shaft of the rotative actuator and wherein the torsional force of the spring is such that the pre-stressing action of the restoring element is at least partly compensated.

Hendzel teaches robotic assembly with a control arm (48) is provided with a restoring element (54) such as to provide a restoring force against the force exerted by the driving element (biases control arm in retracted position) comprising a torsional spring (54) and wherein the torsional force of the spring is such that the pre-stressing action of the driving element is at least partly compensated (spring coils and uncoils to compensate) for the purpose of providing a biasing member to return the control member to a particular position (C3/L63-C4/L5).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Rosheim and provide the control arm with a restoring element such as to provide a restoring force against the force exerted by the rotative actuator comprising a torsional spring arranged to bias the shaft of the rotative actuator and wherein the torsional force of the spring is such that the pre-stressing action of the restoring element is at least partly compensated, as taught by Hendzel, for the purpose of providing a biasing member to return the control member to a particular position.

12. Claims 16-18, and 20, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosheim '940 in view of Shahoian, US PGPub 2001/0000663.

Rosheim discloses all of the claimed subject matter as applied above.

Rosheim does not disclose a sensor for measuring the aperture angle of each control arm and a processor for calculating the position of the moveable member based on the results of the measurement, a wrist module arranged in series with the parallel

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transmission structure and adapted to provide at least one rotational degrees of freedom, wherein the wrist module is adapted to provide a tactile feedback and comprising a force sensor located underneath the wrist module.

Shahoian teaches a sensor for measuring the aperture angle of each control arm and a processor for calculating the position of the moveable member based on the results of the measurement (see paragraph 0036 and computer 16 which is the processor), a wrist module (34, 37 and 22) arranged in series with the parallel transmission structure (the arm) and adapted to provide at least one rotational degrees of freedom, wherein the wrist module is adapted to provide a tactile feedback (see abstract, and paragraphs 7, 11, 13 and 45) and comprising a force sensor located underneath the wrist module (all sensors under the cover of 22/70) for the purpose of providing an improved user feedback system (see abstract and paragraph 11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Rosheim with a sensor for measuring the aperture angle of each control arm and a processor for calculating the position of the moveable member based on the results of the measurement, a wrist module arranged in series with the parallel transmission structure and adapted to provide at least one rotational degrees of freedom, wherein the wrist module is adapted to provide a tactile feedback and comprising a force sensor located underneath the wrist module, as taught by Shanoian, for the purpose of providing an improved user feedback system.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES PILKINGTON whose telephone number is (571)272-5052. The examiner can normally be reached on Monday - Friday 7-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JAMES PILKINGTON/  
Examiner, Art Unit 3656  
2/23/09

/Richard WL Ridley/  
Supervisory Patent Examiner, Art Unit 3656

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